

Seat Belt Use:

**Workbook and Guide for
Evaluating Community-Based Programs**

California Office of Traffic Safety

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To those who will be conducting these surveys: we invite you to contact us at any point with any questions that you have about conducting the observations and analyzing the results. You may reach us by phone or at the e-mail addresses below.

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Introduction and Purpose

The leading cause of injury and death for Californians is motor vehicle crashes. According to the National Highway Traffic Safety Administration, safety belts are the most effective safety device in vehicles and would save thousands of lives each year, if consistently used by all.

The California Office of Traffic Safety (OTS) is working to increase use of seat belts by funding local agencies throughout the state to focus on seat belt programs in their communities. This workbook is designed to be used by these local programs to 1) evaluate the impact of their activities on seat belt use, 2) evaluate results to improve or modify the programs as needed, and 3) meet contractual evaluation requirements.

Program evaluations can be difficult for local agencies due to high service demands and limited resources. We hope this workbook supports local programs and agencies by providing the evaluation method and tools. A before-and-after study design is described that measures restraint use *before* the intervention occurs (to provide a baseline rate) and then *after* the intervention (to document any change). The UC Berkeley Traffic Safety Center will offer direct support and guidance to those programs using these instructions.

How to Use the Workbook

This workbook will help you measure current seat belt (restraint) use in your targeted area and to determine how much seat belt use changed after your program or enforcement activities. The workbook walks you through the basic steps necessary to conduct the before (or base) and after studies to evaluate the impact your program. It starts with instructions for conducting observations that can be used in planning your program and in training observers. Then, you will find instructions for setting up your study, and for collecting and analyzing your data.

As you fill in the workbook, you can refer to, or click on, the corresponding sections of the Guide (Appendix B), which explains each section of the workbook step-by-step. It provides rationales, as well as some optional analyses you can conduct in order to understand seat belt use in your area.

Seat Belt Use: Evaluating Community-Based Programs

Workbook

Seat Belt Use: Evaluating Community-Based Programs

In order to conduct your *before/base* and *after* observations, complete steps 1-9 below. As you work on each section, turn to or click on the corresponding sections of the Guide, which provides additional explanation of the steps.

1. Indicate your city, county or other target population. (See Guide, Step 1)

_____.

2. At what sites and times will you be conducting your observations? (See Guide, Step 2)

Site A: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	
Site B: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	
Site C: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	
Site D: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	
Site E: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	
Site F: _____	Time 1: _____	Time 2: _____	
	Date 1: _____	Date 2: _____	
	Circle: M T W Th F	Circle: M T W Th F	

3. What is the current estimate of seat belt use in your area? (See Guide, Step 3)

- a. The current estimate is _____.
- b. What percentage point increase do you expect your program will have on seat belt use? _____.
(To be determined with your OTS Regional Coordinator)

4. Refer to Table 1 below to determine the number of observations to make. (See Guide, Step 4)

- 4a. Number of observations _____. (see Table 1 below)
- 4b. Number of observations at each site _____.

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Table 1 – Determining the number of observations to conduct.

Estimated current rate of seat belt use in your target area	Percentage point increase in seat belt use that you expect to make with your intervention					
	2%	3%	4%	5%	10%	15%
	Number of Observations					
50%	5,632	2,502	1,406	860	225	100
60%	5,362	2,371	1,327	810	205	95
70%	4,640	2,041	1,136	695	175	75
80%	3,468	1,520	831	515	120	50
90%	1,846	779	414	265	NA	NA

5. Who are your observers? (See Guide, Step 5)

Fill out observation schedule with observers' names:

Observer 1: _____
 Observer 2: _____
 Observer 3: _____
 Observer 4: _____
 Observer 5: _____
 Observer 6: _____
 Observer 7: _____
 Observer 8: _____
 Observer 9: _____
 Observer 10: _____

6. Prepare for the Observations. (See “Conducting Observations” on page 10 and Guide, Step 6)

Review “Protocol for Conducting Observations” at the end of the Workbook. Use this sheet when training observers.

To each site, bring 1 Site Form and a handful of Observation Forms. The Observation Forms are used to record each observation. The Site Form is used to tally the observation forms for one site. (See Appendix A for Data Collection Forms.)

When you are finished making all of your observations at all of your sites, use the Summary Form to tally the Site Forms.

7. What is the “before” program or “base” use rate? (See Guide, Step 7)

7a. Total Wearing Seat Belts (*Before/Base* Summary Sheet) _____.

7b. Total Occupants Observed (*Before/Base* Summary Sheet) _____.

7c. “Before” Program /Base Use Rate ____% (per formula below)

$$\text{Percent(\%) restrained} = \frac{\text{TotalRestrained}}{\text{TotalOccupantsObserved}}$$

8. Project Activities. (See Guide, Step 8)

At this point, you will perform your project activities.

9. What is the “after” use rate? (See Guide, Step 9)

About a month after your intervention, measure seat belt use again according to a-c below.

9a. Total Wearing Seat Belts (*After* Summary Sheet) _____.

9b. Total Occupants Observed (*After* Summary Sheet) _____.

9c. “After Program” Use Rate ____% (per formula below)

$$\text{Percent(\%) restrained} = \frac{\text{TotalRestrained}}{\text{TotalOccupantsObserved}}$$

Protocol for Conducting Observations

1. Pick sites that are reasonably representative of the community you are targeting. Before/base and after observations should be conducted at the same locations, same time and day of the week, and under similar environmental conditions (e.g., weather).
2. Select intersections or roadways and times that will include local drivers, not commuters or shoppers from other areas.
3. Identify a safe, convenient location from which to make observations (for example, a raised curb). Make observations at an intersection or other roadway site where this is a traffic signal or stop sign, and stand where you can see vehicles as they pause or slow down for the traffic signal or sign.
4. Choose specific days and times to match the peak hours of the observation sites. Selected sites should attract a fairly high number of the target population for efficiency of data collection. If there is not a lot of vehicle volume at the time you are observing, observe all vehicles. If there is a high vehicle volume, select the next vehicle to observe upon completion of the previous observation.
5. As you look at the vehicle, record whether the driver and front outboard passenger, if any, are restrained (wearing seat belts) or not. The front outboard passenger is the front-seat passenger closest to the passenger window. Do not observe back seat passengers.
6. Observe cars, pick-up trucks, SUVs, and vans.
7. For safety and security, observers should work in teams of two and wear orange vests, or similar safety clothing that makes it easy to be seen by moving vehicles.
8. Choose a clear, dry day with maximum visibility.
9. Observe approximately the same number of people at each site. For example, if your sample size is 120, and you will observe at four sites, then you should observe about 30 individuals at each site. If you are not able to observe enough people at a site, you will need to re-assess the site. Perhaps there would be more observations at a different time of day. You might need to identify a different site.
10. Materials to bring to the observations:
 - Address of the observation site(s)
 - Orange vests or similar safety clothing to make the observers more visible and to identify the observer as having an official role
 - Site forms, observation forms, and summary forms
 - Clipboard (you might want to put “Traffic Survey” in bold letters on the back)
 - Pencils or pens for filling in forms
 - Watch
 - Cell phone

Appendix A -- Data Collection Forms

1. Site Form
2. Observation Form
3. Summary Form

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1. SITE FORM

INSTRUCTIONS

Fill in one of these forms for each observation period at each site, and for observations *before* and *after* the intervention.

Observation Site* _____

Agency Name _____

OTS Project Number _____

Observer Name	
Site Location or Description	
Traffic Volume	
Date	
Day of the Week	
Time of Day	
Weather	
Total Restrained	
Total Unrestrained	
Total No. of People Observed	
Total Vehicles Observed	
Comments	

* Street location or intersection

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2. OBSERVATION FORM

INSTRUCTIONS: *Fill in one (or more, if needed) of this form for each observation session.*

Agency Name _____

Page ____ Of ____ For this Site & Time

OTS Project Number _____

DATE _____

DAY (Circle one): M Tu W Th F Sat Sun

START TIME ____:____ am/pm

Observation Site _____

END TIME ____:____ am/pm

Name of Observer #1 _____

TOTAL TIME _____ (minutes)

Name of Observer #2 _____

Check one: ☐ Observation *Before/Base* Intervention ☐ Observation *After* Intervention

OBSERVATION #	OCCUPANTS RESTRAINED		OCCUPANTS UNRESTRAINED	
	DRIVER	FRONT OUTBOARD PASSENGER	DRIVER	FRONT OUTBOARD PASSENGER
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTALS				

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Page ____ of ____ (print or copy as many as needed)

OBSERVATION #	OCCUPANTS RESTRAINED		OCCUPANTS UNRESTRAINED	
	DRIVER	FRONT OUTBOARD PASSENGER	DRIVER	FRONT OUTBOARD PASSENGER
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTALS				

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3. SUMMARY FORM

The purpose of this form is to summarize the information from your Site and Observation forms.

Site Name _____

Project Name _____

OTS Project Number _____

Date(s) of observations _____

SITE (Specify location)	Occupants Observed			
	Drivers Restrained	Front Outboard Passengers Restrained	Drivers Un- restrained	Front Outboard Passengers Unrestrained
#1				
#2				
#3				
#4				
#5				
#6				
Total				

Appendix B -- Guide

Seat Belt Use: Evaluating Community-Based Programs

Guide Step 1—Indicate Your City, County or Other Target Population

The primary purpose of the evaluation is to determine the degree to which seat belt use changes after your program intervention. To conduct a successful program for increasing restraint use, it is necessary to establish goals, objectives and activities that match your available resources.

Get the most for your \$\$\$

First, in order to produce a program impact that can be measured, it is important to design your intervention program to match the resources that you have available for the intervention. Your target might be an entire city, or you might be able to target a region in a larger city or county.

Measure only the people reached by your program

Second, you want to design the evaluation to closely match the intervention. Because you want to capture any impact your program might have, you should conduct the observations for the evaluation *at the same site(s)* (e.g., intersections or other roadways locations). Pick 3-5 specific sites for activities, *and then conduct the before and after observations for the evaluation at those same sites*. It is best to choose observation places that are typically used by people living in the area, as opposed to places that attract people from outside the targeted area, such as roadways with regional shopping malls.

Determine your target population

The target population is drivers or front outboard passengers of motor vehicles (that is, the passenger closest to the passenger-side window in the front seat). You will not be observing passengers in back seats. However, the target population is further defined by the focus of the intervention. If the intervention is aimed at schools, then the target population includes vehicle occupants driving to and from the school sites. If the intervention is aimed at a particular area or population segment of your community, then the target population consists of drivers and passengers from those areas or population groups.

Guide Step 2—Sites and Times for Conducting Your Observations

Choose a Logical Observation Site

Observations should be conducted at an intersection or other roadway site where there is a traffic signal or stop sign. The “Protocol for Conducting Observations” at the end of the Workbook includes elements of good observation sites, including:

- Pick sites that are reasonably representative of the community you are targeting. Before/after observations should be conducted at the same locations, same time and day of the week, and under similar environmental conditions (e.g., weather).
- Intersections or roadways should be frequented by include local drivers, not commuters or shoppers from other areas.
- A safe, convenient location from which to make observations should be identified (for example, a raised curb with full view of the surveillance area). Observations should be conducted at an intersection or other roadway site where there is a traffic signal or stop sign. Observers should stand where they can see vehicles before they enter the intersection (where it is possible that the vehicles will stop at a signal or sign).
- Selected sites should attract a fairly high number of the target population for efficiency of data collection. If there is not a lot of vehicle volume at the time of observation, observe all vehicles. If there is a high vehicle volume, select the next vehicle to observe upon completion of the previous observation.
- Upon looking into the vehicle, notice and record whether the driver and front outboard passenger, if any, are restrained (wearing seat belts) or not. The front outboard passenger is the front-seat passenger closest to the passenger window. Do not observe back seat passengers.
- Observe cars, pick-up trucks, SUVs, and vans.
- For safety and security, observers should work in teams of two and wear orange vests, or similar safety clothing that makes it easy to be seen by moving vehicles.
- Observations should be conducted on clear, dry days with maximum visibility.
- Approximately the same number of people should be observed at each site. For example, if your sample size is 120, and you will observe at four sites, then you should observe about 30 individuals at each site. If you are not able to observe enough people at a site, you will need to re-assess the site or the time that you conduct the observations.

Guide Step 3—Current Estimate of Seat Belt Use in Your Area

Estimate Current Seat Belt Use in Your Area

Note that even though you will be conducting observations to determine the baseline rate of seat belt use, you still need an estimate of baseline use to calculate the recommended sample size. If you need an estimate of the baseline rate for *your* community, please contact Raul Betancourt at California State University, Fresno at 559-297-8990 or through e-mail at raulb@csufresno.edu. Dr. Betancourt conducts the statewide observations of seat belt usage for the Office of Traffic

Safety. If there is no estimate for your own city or county, then use an estimate for a city or county that is similar to yours (e.g., in size, urban vs. rural geography).

The Increase Your Program Will Have on Seat Belt Use

Before your program begins, you will be meeting with your OTS Regional Coordinator to discuss your goals and objectives and the change you want to see in seat belt use.

Guide Step 4—Determine the Number of Occupants to Observe

Number of Observations to Make

If you are star-gazing with a telescope, the smaller (farther) the star or planet you want to see, the more powerful telescope you will need. Likewise, the smaller the change in seat belt use you want to observe, the more powerful your study needs to be in terms of the numbers of observations. Use Table 1 below to select the recommended minimum number of drivers and passengers to observe before and after your intervention. Even though you will be conducting observations to determine the baseline rate of seat belt use, you still need an *estimate* of baseline use to calculate the recommended sample size.

For example, if you have a starting use rate of around 70%, you need to make about 175 observations to detect an increase of 10 percentage points after the intervention, but only about 75 observations to detect an increase of 15 percentage points.

Table 1 – Determining the number of observations to conduct.

Estimated current rate of seat belt use in your target area	Increase in seat belt use that you expect to make with your intervention					
	2%	3%	4%	5%	10%	15%
	Number of Observations					
50%	5,632	2,502	1,406	860	225	100
60%	5,362	2,371	1,327	810	205	95
70%	4,640	2,041	1,136	695	175	75
80%	3,468	1,520	831	515	120	50
90%	1,846	779	414	265	NA	NA

But that's too many observations to make!

Does it seem like you need to make too many observations? In some rural communities, or communities with small populations, it may be difficult to make the necessary number of observations.

Note that the higher the current seat belt use rate, and the higher the increase you plan to make, the smaller the number of observations you need. Therefore, the best way to reduce the number of observations is to plan to make a higher increase in seat belt use. This can be done by focusing (as mentioned in Step 1) on higher risk populations; i.e., populations with generally lower use rates. This may require a change in your project goals and/or objectives. In this case, you should contact your OTS Project Coordinator.

Perhaps the size of your target population is very small (for example less than 100), because you live in a rural area. If this is the case, sample slightly more than 50% of your population. For example, if your target population is only 40 people, sample at least 21; if your target population is 60, sample at least 31. This method should be reserved for extremely small target populations only.

How many observations should you make at each site?

You should aim to make the same number of observations at each site. For example, if you have chosen five sites, and Table 1 indicates that you should make 100 observations, you should try to make 20 observations at each site. ($100 / 5 = 20$).

Guide Step 5—Who are Your Observers?

Find Observers

The next task is to identify and train observers. Observers can be paid staff or volunteers from the community.

Train observers

To train observers, use “Protocol for Conducting Observations” at the end of the Workbook.

Guide Step 6—Prepare for the Observations

Data Collection Forms

Review the data collection forms provided in Appendix A:

- A **Site Form** is used to record basic information about the observation at a particular site on a particular day. Recording this information will help document that the *before* and *after* observations will be done in the same locations, same time and day of the week, and under similar environmental conditions (e.g., weather).
- An **Observation Form** is used to record each observation conducted during a particular observation session. If you observe more than 20 vehicles at a site, then you will need to use more than one observation form.
- A **Summary Form** is used to record the totals from each observation session.

Conduct observations

Again, review “Conducting Observations” at the end of the workbook.

Guide Step 7—Your “Before Program” or “Base” Use Rate

At this point, you have a number of Observations Forms filled out for each site, and you are ready to calculate the seat belt use rate before your intervention.

Fill out the Summary Form

Copy the bottom “Total” figures on each Observation Form onto the Summary Form. If you have completed four observation forms, then just four lines of the Summary Form will be filled in. Add all the numbers in each column, and enter these totals in the bottom row. These totals will give you the numbers for 7a and 7b of the Workbook.

The totals for the columns “Restrained” and “Unrestrained” can then be used to calculate the percent (%) of occupants who are restrained; i.e., wearing seat belts. This is done by the following calculation (for 7c of the Workbook):

$$\text{Percent(\%) restrained} = \frac{\text{TotalRestrained}}{\text{TotalOccupantsObserved}} \times 100$$

This number represents an estimate of the percent of your target population who are restrained in seat belts. For example, if there were a total of 75 individuals restrained and a total of 40 unrestrained from all of your sites, the formula would be:

$$65\% \text{ restrained} = \frac{75}{75 + 40}$$

Depending on your programs goals and objectives, you might choose to repeat the above calculation for drivers and front outboard passengers separately. In this case, the data you will be

analyzing will be “Total Drivers (or Front Outboard Passengers) Restrained” with regard to the total occupants you observe. Or, you might choose to see what percentage of drivers is restrained *just* in relation to all drivers, not both drivers and passengers. In that case, you would calculate “Total Drivers Restrained” over “Total Drivers.”

OPTIONAL

Calculate the “Error” in Your Estimate

Often in the newspaper you will read a sentence like “56% support the poll, and this study had a margin of error of +/- 4%”. Do you want to write a news article about your program that says “We started with a seat belt use rate of 85% +/- 3%, then we implemented our intervention program and seat belt use increased”?

This can be done by calculating a “Margin of Error” (MOE) for your estimate. The MOE is a number range (e.g., “plus or minus 3”) that represents the degree to which the study results are “true” or happen due to “luck of the draw.” You can calculate a rough MOE by consulting Table 2. (This table offers the margin of error with a 90% confidence level.) To use Table 2 you first need the total number of vehicle occupants observed, and the percent that wore seat belts.

Table 2 – Calculating the Margin of Error (MOE)

	Observed % of Seat Belt Use (#7c)								
Num of Occupants Observed (#7b)	10%	20%	30%	40%	50%	60%	70%	80%	90%
50	7	9	11	11	12	11	11	9	7
100	5	7	8	8	8	8	8	7	5
150	4	5	6	7	7	7	6	5	4
200	4	5	5	6	6	6	5	5	4
250	3	4	5	5	5	5	5	4	3
300	3	4	4	5	5	5	4	4	3
350	3	4	4	4	4	4	4	4	3
400	2	3	4	4	4	4	4	3	2
450	2	3	4	4	4	4	4	3	2
500	2	3	3	4	4	4	3	3	2

Table 2. If you observed 100 individuals, and your observed rate of use was 80%, then the margin of error is 80 plus or minus 7%. Seat belt use at your project sites is between 73 (i.e., 80 – 7) and 87 (i.e., 80 + 7). In general, it is better to have a smaller range; a smaller range means that your estimate is more reliable. To help you do determine the margin of error in your base measurement, follow these steps:

- Number of Occupants Observed (#7b) _____.
- Percent of Occupants Wearing Seat Belts (#7c) _____ %.
- Baseline, or “Before Intervention” Margin of Error +/- (Table 2) _____ %

d. “Before implementation of our program, (b) _____% of vehicle occupants in this area wore seat belts; this finding has a margin of error of plus or minus (c) _____%.”

Guide Step 8—Conduct Your Project Activities

At this point, you will perform your project activities.

OPTIONAL

Please comment on your intervention program.

1. What events are you planning for your intervention program (e.g., periods of police enforcement, education workshops with parents, etc)? Please list the events, the data they will take place, the intended audience, and the size of the audience.

Event	Description	Date	Audience	Size
1				
2				
3				
4				

2. What surprises or difficulties were there in the implementation of your interventions?

Event	Description	Surprises/Difficulties/Challenges
1		
2		
3		
4		

3. Did any unintended results or activities occur? Please describe.

4. Please provide other comments or anecdotal information about your program.

Guide Step 9—Your “After” Program Use Rate

About a month after your intervention, measure seat belt use again.

Measuring seat belt use after the intervention is done exactly the same way as it was done before the intervention. Pick the same day of the week, the same time of day and the same location, and try to observe approximately the same number of vehicles. There is no standard amount of time after the intervention for doing the after observation, but it would be advisable to try to conduct the after observations within a month of the conclusion of the intervention.

You should use the same (blank) data forms for the after observations. Calculate totals for each observation form and calculate overall totals using exactly the same steps as for the before observations. The percent restrained in seat belts in the after observation is calculated as before (see pages 15-16).

$$\text{Percent(\%) restrained} = \frac{\text{TotalRestrained}}{\text{TotalOccupantsObserved}} \times 100$$

OPTIONAL

Community Seat Belt Patterns

To understand the range of seat belt use patterns in your community, you might be interested in answering the following questions:

- How many drivers wore seat belts out of all drivers observed?
- What percentage of drivers vs. front seat passengers wore seat belts? In what percentage of the time was the driver buckled up, but not the front seat passenger?
- What percentage of the cars could we not see into well enough to make an observation?

Statistically Comparing Before/Base and After Seat Belt Use

You might also decide that you want to compare *before/base* and *after* intervention seat belt use. This is an optional step that will help to determine the degree to which any change you notice occurred as a result of your intervention vs. whether it was due, for example, to chance.

To conduct this analysis, review your data. You should now have an estimate of the percent (%) restrained before the intervention (“% Before”) and an estimate of the percent restrained after the intervention (“% After”). The task now is to compare the difference between the two and get a “Difference Score” (or, the percentage point difference). The Difference Score represents any change that occurred as a result of your intervention and is determined by subtracting the percent before (“% Before”) from the percent restrained after (“% After”), or:

$$\text{Difference Score} = (\% \text{ After}) - (\% \text{ Before}).$$

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For example, suppose that the percent wearing seat belts before the intervention was 70% and the percent using seat belts after the intervention was 76%. The Difference Score would be 6% (e.g., $76-70=6$).

Here is the calculation:

- a. % Use *After* Program (#9c) _____ %.
- b. % Use *Before* Program (#7c) _____ %.
- c. Percentage Point Difference _____ = (a) _____ - (b) _____

Is it a big difference?

It is important to know if the difference in restraint use rates before and after your program is a “true” difference; that is, would you get the same difference if you did this whole guide and your program all over again? This can also be done calculating a margin of error (MOE) using Table 3. This MOE describes the statistical error in the difference between the restraint use rates before and after your intervention. In other words, it is the margin of error for the impact of the intervention.

Table 3 looks like Table 2, but its use is slightly different. First, the number of occupants observed should be the **average number of occupants** observed in the “% Before” and “% After” observations (calculated below). Second, it uses the seat belt use rate *before* the intervention (the rate you calculated in #7c).

First, determine the average number of occupants. Using the *Before/Base* Summary sheet and the *After* Summary sheet, the average number of occupants can be computed like this:

$$\text{Average \# of occupants observed} = \frac{\text{TotalOccupants(before)} + \text{TotalOccupants(after)}}{2}$$

Here is the calculation:

- a. Total Occupants Observed *After* (#9b) _____.
- b. Total Occupants Observed *Before* (#7b) _____.
- c. **Average number of occupants** _____ = $\frac{(a) \text{ _____} + (b) \text{ _____}}{2}$

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Now you are ready to use the Table 3 to look up the Difference MOE.

Table 3 - Calculating the Margin of Error (MOE) of the Difference

	Seat Belt Use Rate <i>Before</i> Intervention (#7c)								
AvgNum of Occupants Observed (see above)	10%	20%	30%	40%	50%	60%	70%	80%	90%
50	11	14	15	16	16	16	15	13	9
100	8	10	11	12	12	11	10	9	6
150	6	8	9	9	10	9	8	7	5
200	5	7	8	8	8	8	7	6	4
250	5	6	7	7	7	7	7	6	4
300	4	6	6	7	7	7	6	5	4
350	4	5	6	6	6	6	6	5	3
400	4	5	5	6	6	6	5	4	3
450	4	5	5	5	5	5	5	4	3
500	3	4	5	5	5	5	5	4	3

What is the MOE corresponding to the average number of occupants and the before intervention seat belt use rate? (Table 3) _____.

So What Does this Difference MOE Tell You?

Let's say that the restraint use rate after your intervention was 80%, and your margin of error is 5. This MOE means that if you were to repeat these measurement instructions and your intervention all over again, you would probably measure anywhere from 75% to 85% restraint use after your intervention.

$$(\text{after rate} - \text{MOE}) = 80 - 5 = 75$$

$$(\text{after rate} + \text{MOE}) = 80 + 5 = 85$$

Let's look at another scenario. Let's say the restraint use rate after your intervention was 90%, and your margin of error you found in Table 3 is 9. That means that if you were to measure the after-intervention restraint use rates again, you would find anywhere from 81% to 99% of occupants wearing seat belts.

$$(\text{after rate} - \text{MOE}) = 90 - 9 = 81$$

$$(\text{after rate} + \text{MOE}) = 90 + 9 = 99$$

Suppose that in this example, you had measured the before intervention restraint use rate as 85%. You know that restraint use after your intervention is anywhere between 81% and 99%. Uh-oh!

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81 is less than 85! Does this mean that your program decreased seat belt use? This finding just means that your data are not statistically very strong. ***Does this mean we didn't do a good job?*** Not at all. It's very difficult to make observations and there are lots of sources of error in measuring use. In addition, you just measured a "random" sample -- maybe you had "strange luck", like rolling 5 dice and having a "6" appear on each of the dice. In your report, you might want to mention the difficulties you encountered while making observations -- this would provide invaluable lessons to you and to other programs.

What are your conclusions?

- a. Before Intervention Seat Belt Use Rate (#7c) _____.
- b. After Intervention Seat Belt Use Rate (#9c) _____.
- c. Margin of Error in the Difference (MOE, from Step 9 Optional Calculations) _____.
- d. (after rate – MOE) = (b) _____ - (c) _____ = _____.
- e. (after rate + MOE) = (b) _____ + (c) _____ = _____.

Conclusion: Before your seat belt program, the restraint use rate in your _____ (*target population*) _____, was _____ (*a*) _____. After your program, the use rate was _____ (*b*) _____ plus or minus _____ (*c*) _____. Note: If (d) are (e) are greater than (a), then you are confident that your program increased restraint use. Congratulations! If (d) or (e) increased restraint use; if this is the case, in your written summary to OTS, please describe _____ the difficulties you encountered while conducting your program or making your observations.

Here are some examples:

Case A:

Occupant Safety Program A proposed to increase seat belt use in its city by providing a series of seat belt clinics at a shopping center frequented by residents of the city. Because there were not sufficient resources to evaluate the impact on the entire community, a particular section of the city with relatively low seat belt use was selected for the intervention and the observations. The survey taken *before* the intervention showed a seat belt use rate of 80%. The survey taken *after* the intervention showed a seat belt use rate of 92%. About 150 individuals were observed before the intervention, and about the same number of occupants were observed after the intervention.

Interpretation of Case A:

The seat belt use rate increased from 80% before the intervention to 92% after the intervention, i.e., a percentage point difference in the use rate of 12%. With about 150 motor vehicle occupants observed, and with a baseline rate of 80%, the MOE is plus or minus 7% (Table 3). In other words, the seat belt use after the intervention program was greater than 85% ($92\% - 7\% = 85\%$) and less than 99% ($92\% + 7\% = 99\%$). You can conclude that "*Restraint usage at the selected sites **increased** since the implementation of project activities.*"

Case B:

Occupant Safety Program B proposed to increase restraint usage by 5% at 5 local high schools. *Before* observations, intervention activities, and *after* observations were conducted at the same five schools. About 40 individuals were observed at each site before the intervention, and about the same number were observed after the intervention. The seat belt use rate was 85% before the intervention and 87% after the intervention.

Interpretation of Case B:

With about 200 individuals observed (about 40 at each of five sites), and a baseline rate of 85%, the MOE is plus or minus 6% (see Table 3). In other words, seat belt use after the intervention program is greater than or equal to 81% ($87\% - 6\% = 81\%$) and less than or equal to 93% ($(87\% + 6\% = 93\%)$). This is a fairly weak finding—a net increase in use was observed, but the increase could have come about by chance, i.e., not due to the intervention. Claims about the impact of the program should be made with caution.

OPTIONAL

Multiple Observation Periods

If you wish to do multiple “observations”, simply repeat steps 6, 7, 8, and 9.